135

2-1-69

Joshua Lederberg

Sea-Level Canal Points Up Need for Environment Data

AN INSEPARABLE companion of the growth of human culture is the modification of the environment of the planet. That environment is not merely an amenity that should be conserved to gratify our esthetic whimseys. It is where we live and work.

The pace of environmental change is accelerating before our eyes as we build more and more powerful instruments at the same time that the sheer numbers of our species crowd the earth. This generation is the first to have seen mega-experiments that had global consequences far too rapidly to hope to measure all the consequences.

Two of these mega-experiments stand out in sharp perspective today: the nuclear bomb tests (with the hazards of global radioactive fallout) and the residual pesticides like DDT. The latter have unquestionably spread all over the earth, from which they will not rapidly disappear. The only controversy is just how harmful they may be for survival of various birds and fishes and for the ecological balance of the oceans.

THE LEVEL of commentary by scientists on these matters is becoming ever shriller in proportion to two factors: how little we actually know about the ecological hazards, and the horrors for man that might be irreversibly triggered when policies are made in a mood of studious ignorance.

Scientists' tentative conclusions about these hazards usually fall short of the rigorous proof to which they customarily appeal. For many mega-experiments, this is an unachievable standard, and the planet could be committed to the ash heap before such a fate was proven by the standards of laboratory experimentation.

In such matters of judgment, the recommendations of scientists cannot be taken at face value, and are likely to be contradictory anyhow. To ignore them, however, would be negligence to the point of an unforgiveable crime against nature.

Our dilemmas are nicely illustrated by current controversies about the possible effects of the proposed sea-level successor to the Panama Canal reported in depth in the Jan. 10 Science magazine. The main concern seems to be that the free communication between the continental shelf of the Pacific with the Atlantic side will commingle marine species that have evolved separately for over a million years. The bioecology of over 10,000 miles of tropical coastline, involving an equal number of marine species, is likely to be involved.

THE PRECISE consequences of this new biological competition are impossible to predict. Undoubtedly some species would be wiped out, just as others would find new homes in which they could flourish better than ever. Some marine animals might hybridize to give sterile offspring, possibly endangering both the Pacific and the Atlantic varieties.

The direct impact of the experiment may be of more concern to naturalists than to economists, but any disturbance of the food chain is likely to have important effects on fisheries. And this is the very industry in which we repose great hopes for improving the world's food supply.

My own assessment of the consequences is no better informed than anyone else's. It is clear that there will be a sudden impact on the genetic variability available to the various species and that we can look to the probable evolution of many new species as well as an upset in the numerical balance of many others.

WHETHER THE result is ultimately labeled good or bad, it will unquestionably be of the greatest scientific interest. What many scientists fear is that such a canal may be built without the studies needed to follow what is going on, much less to assess its possible side-effects. As a molecular biologist interested in evolution, I would at least insist that large samples of present marine life at various stations be carefully frozen for later examination.

The crucial point is that the canal study is being undertaken in such a mood "that, with a multitude of political, diplomatic, engineering, military and financial problems facing the commission, the scientific considerations tend to get lost."

President Nixon was urged by his preinaugural task force on resources and environment to name a Special Assistant for Environmental Affairs to work closely with him. The need to assess the irreversible consequences of a sea-level canal shows that such an appointee would not lack for important tasks.